



Department of Environmental Protection
Bureau of Land & Water Quality April. 2002

O&M Newsletter

A monthly newsletter for wastewater discharge licensees, treatment facility operators and associated persons

Energy Conservation in Wastewater Treatment Facilities

In the February & March issues of the *O&M News*, we published articles on energy conservation. In this issue, we continue that series with some thoughts about pumps and pumping. This article is reprinted from a report titled "Saving Money and the Environment Through Energy Savings". The report was the result of a joint effort between staff from the Region 1 EPA Office in Boston, several of the New England States, several New England Utilities, several consultants and vendors in doing business in the energy field and the New England Interstate Water Pollution Control Commission.

Motors: Are energy efficient motors really worth it?

Although the initial cost of an energy efficient motor can be fifteen to thirty percent higher than for a comparable standard motor, the savings usually offset the higher capital cost in two years or less. Because pumps and blower motors account for eighty to ninety percent of the energy costs at wastewater treatment facilities, energy efficient motors can play a major role in reducing a facility's operating costs. The lifetime energy costs to operate a continuous-duty motor are ten to twenty times higher than the original motor price. Use the following formulas to calculate the annual energy savings and simple payback from selecting a more efficient motor. Simple payback is defined, as the time required for the savings from an investment to equal the initial cost.



$$\begin{aligned}\text{Annual Energy Savings, kWh/yr.} &= \text{hp} \times \text{L} \times 0.746 \text{ kW/hp} \times \text{hrs} \times (100/\text{Estd} - 100/\text{Eee}) \\ \text{Annual Cost Savings, \$/yr.} &= \text{kWh/yr. saved} \times \text{utility rate}\end{aligned}$$

hp = rated motor horsepower

L = load factor as decimal

Estd = % efficiency standard motor

Eee = % efficiency energy efficient motor

hrs = Annual operating hours

$$\text{Simple Payback (Years)} = \frac{\text{initial cost}}{\text{Annual cost savings}}$$

Motor (hp)	Purchase Cost (\$)			Efficiency (%)		Annual Savings		Simple Payback (years)
	SE	EE	Difference	SE	EE	kWh	\$	
10 ^a	614	795	181	86.5	91.6	2103	210	0.86
25 ^a	1230	1608	378	88.1	94.2	6004	600	0.63
50 ^a	2487	3207	720	90.6	96.0	9352	835	0.86
100 ^a	5756	7140	1384	90.7	95.7	18,822	1882	0.74
200 ^b	11,572	13,369	1797	94.6	96.1	10,782	1078	1.67
300 ^b	15,126	18,385	3259	94.6	96.0	15,111	1511	2.16

Note: Based on 16 hr/day operation at 75% load and \$0.10/kWh
^a Reliance Standard-Efficiency and Premium-Efficiency Motors
^b G.E. EnergySaver and Standard-Efficiency Motors

- ◆ For continuous operation, 8760 hrs- Replace all low efficiency motors with premium efficiency motors.

When calculating the operating costs for rewind motors, deduct one efficiency percentage point for motors larger than forty horsepower and two points for smaller motors. As an example, a one point gain of motor efficiency for a twenty-five horsepower motor saves about \$136/ year, or \$ 2040 over its lifetime (based on \$0.10/kWh, 75% load, and 15 year life). U.S. Department of Energy's MotorMaster software can help you compare efficiencies of like models and select the most appropriate motor for your application.

You can obtain a report containing further tips on improvements to each of these areas by contacting Dick Darling at the DEP.

Electronic Copies of the O&M news

We're up to about 90 operators and others interested individuals who have signed up to get the O&M News via e-mail. You can find it on the DEP Web site at

http://www.state.me.us/dep/blwq/newslet/o_mnews.pdf, but e-mail is a quicker way to get the news in your hands. (And we promise not to throw it in the bushes.)

If you have e-mail and would like to receive the O&M News electronically instead of in the mail, please send an e-mail to:

dick.darling@state.me.us

We will add your e-mail address to our e-mail group and start sending your O&M News electronically.

For Practice

1. What is the sludge concentration at which pumping becomes difficult?

- a. 10%
- b. 5%
- c. 2%
- d. 1%

- 2. The common parameter mg/L (milligrams per liter) is the same as
 - a. Grains/Gallon
 - b. parts per million (p.p.m.)
 - c. ounces per pound
 - d. grams per cubic foot
- 3. To control an Activated Sludge Process using MLVSS, the operator must maintain
 - a. A constant concentration of suspended solids in the aeration tank.
 - b. A constant concentration of volatile suspended solids in the return sludge.
 - c. A constant concentration of volatile suspended solids in the waste sludge.
 - d. A constant concentration of volatile suspended solids in the aeration tank.
- 4. An operator doses the effluent from his plant with 4 mg/l of chlorine to achieve the necessary bacteria kill. If the flow through the plant averages 4.5 MGD, how much chlorine will be used in 30 days?
 - a. 246 pounds
 - b. 625 pounds
 - c. 2,397.3 pounds
 - d. 4,503.6 pounds

Spring 2002 Exam

The Spring 2002 Wastewater Operator Certification Exam will be given Wednesday, May 15, 2002 in the usual locations, South Portland, Bangor and Presque Isle. Those of you who signed up to take the test will be receiving your conformation letters soon, if they haven't already arrived. The Fall exam will be given on November 13, 2002 at the usual locations.

Update on the review of the "Toxics Rule"

For several months now, DEP has been working to review Chapter 530.5 of its rules, the Surface Waters Toxics Control Program, perhaps better known as the "Toxics Rule". First adopted in the early 1990's and then re-promulgated in October 1994, the program is important to many municipal and industrial wastewater treatment facilities in Maine. The program includes effluent testing for both Whole Effluent Toxicity (WET) and Priority Pollutants (PP). During the past 7 years, a large amount of testing has been done, and both DEP staff and facility operators had to learn to deal with a new set of terms, tests and potential compliance issues. As with many new programs, everyone experienced some learning curves. In 1998, DEP published a series of program protocols that helped clarify some of the lessons learned and sought to make the program run more smoothly under the existing rule.

In 2001, DEP began a comprehensive review of the program with an eye toward rewriting the rule itself. The objective was to base changes on past testing and solicit experiences from various interest groups around the State. The review of past test data was summarized in white papers

prepared by DEP for both the WET and PP testing programs. A stakeholder group was formed and consists of 14 persons representing consulting, legal, industrial, municipal, tribal and environmental interests. The group has met 8 times from July 2001 through March 2002. The members of this group have been of great help to DEP by contributing many hours of work in reviewing every part of the toxics program, and related areas.

To help support the review process, DEP has set up a web site at www.state.me.us/dep/blwq/watertoxicsrule.htm. The site has a copy of the rule, the implementation protocols, the data review white papers, stakeholder meeting notes and other information.

Very briefly, the review of past data showed that the risk of an effluent having toxic effects is strongly correlated to the treatment facility's dilution factor. Other factors, such as the type of treatment, whether the facility was municipal or industrial, or the size of the discharge, did not appear to have much influence on potential toxicity.

Additionally, some tests were less likely than others to indicate a potential for toxicity. These included fathead minnows and Atlantic silversides in the WET tests and organic chemicals in the PP testing.

After having reviewed the test data and individual experiences with the toxicity program, the stakeholders group went through several "strawman" proposals for changes to the rule, some of which are outlined below. These changes are still under development and are not yet formal proposals that will go through the State's rulemaking process. The discussion here is only by way of a status report, and is not a final proposal.

Actually, DEP has proposed that the existing rule be separated into two rules. The portion of the current rule that establishes the State's water quality criteria for toxic substances would become a stand-alone rule since these criteria are important as statewide standards with applicability beyond the effluent toxicity testing program. Changes being discussed for the toxics rule include the categorization of discharges required to do testing, the scope and types of tests, test frequency schedules and how test results are interpreted for setting effluent limits. These are all adjustments to provisions in the existing rule. Additionally, some new concepts are being considered. In the past, background concentrations have not been figured into water quality impact calculations along with effluent monitoring data. Proposed changes will accomplish this by using either specific monitoring data where they are available or default values as a percentage of the water quality criteria for the pollutant in question. Another important area of change is to establish a system to allocate acceptable discharge quantities of priority pollutants among multiple discharge sources in the same watershed or estuary. Such a system would include a "water quality reserve" that would set aside some assimilative capacity for future growth and contributions from non-point sources. The allocation method would be based primarily on past discharge quantities as a percentage of the total available assimilative capacity, with a cap on how much above past quantities existing sources could discharge under the allocation plan.

All treatment facilities and other interested parties are encouraged to follow the development of changes to the toxic program. In the next few months, the proposed changes will be submitted to the Board of Environmental Protection to initiate the formal rulemaking process.

There will be an opportunity for public comment at that point. In the meantime, please check DEP's web site, or contact DEP staff or members of the stakeholders group directly.

Dennis Merrill

UPCOMING TRAINING COURSES

April 16, 2002 in Presque Isle, ME - Basic Microscopy for Wastewater Operators & Using ORP for Process Monitoring WWTP - sponsored by JETCC (207) 767-2649 - Approved for 6 hours.

April 17, 2002 in Brewer, ME - Basic Microscopy for Wastewater Operators & Using ORP for Process Monitoring WWTP - sponsored by JETCC (207) 767-2649 - Approved for 6 hours.

April 17, 2002 in Portsmouth, NH - Optimizing SBR Operation - sponsored by NEIETC (978) 323-7929 - Approved for 6 hours.

April 17, 2002 in South Berwick, ME - Respiratory Protection - sponsored by MRWA, (207) 729-6569 - Approved for 3.5 hours.

April 17 & 18, 2002 in Augusta, ME - Wastewater Math - Grades I-III - sponsored by MRWA, (207) 729-6569 - Approved for 8 hours.

April 18, 2002 in Brunswick, ME - Basic Microscopy for Wastewater Operators & Using ORP for Process Monitoring WWTP - sponsored by JETCC (207) 767-2649 - Approved for 6 hours.

April 24, 2002 in Bangor, ME – Respiratory Protection - sponsored by MRWA, (207) 729-6569 - Approved for 3.5 hours.

April 25, 2002 in Presque Isle, ME – Phosphorous Removal - sponsored by MRWA, (207) 729-6569 - Approved for 4 hours.

April 29 & 30, 2002 in Bangor, ME – Wastewater Math - Grades I-III - sponsored by MRWA, (207) 729-6569 - Approved for 8 hours.

April 30 & May 1, 2002 in Waterville, ME – Wastewater Microbiology and Filament Staining & Identification - sponsored by MRWA, (207) 729-6569 - Approved for 8 hours.

May 1, 2002 in Livermore Falls, ME - Advanced Computer Spreadsheets for Wastewater Operators - sponsored by JETCC (207) 767-2649 - Approved for 6 hours.

May 1, 2002 in Freeport, ME – Stormwater II - sponsored by MRWA, (207) 729-6569 - Approved for 3.5 hours.

May 7, 2002 in Thomaston, ME - Mechanical Packing & Mechanical Seals - sponsored by JETCC (207) 767-2649 - Approved for 6 hours.

May 7, 2002 in East Brewer, ME – Administrative Personnel Roundtable: IRS “Your Rights and Responsibilities” - sponsored by MRWA, (207) 729-6569 - Approved for 4 hours.

May 8, 2002 in Presque Isle, ME – Administrative Personnel Roundtable: IRS “Your Rights and Responsibilities” - sponsored by MRWA, (207) 729-6569 - Approved for 4 hours.

May 8, 2002 in Augusta, ME – Wastewater Certification Review – Grades I-III - sponsored by MRWA, (207) 729-6569 - Approved for 6 hours.

May 9, 2002 in Calais, ME – Administrative Personnel Roundtable: IRS “Your Rights and Responsibilities” - sponsored by MRWA, (207) 729-6569 - Approved for 4 hours.

May 30, 2002 in Presque Isle, ME – Stormwater II - sponsored by MRWA, (207) 729-6569 - Approved for 4 hours.

2002 Operator Certification Renewals

Renewal letters and pocket cards have been sent to all operators who submitted renewal forms and whose training has been verified. Some operators who did not meet the 18 hour training requirement by March 1 will not receive their renewal notice until we can verify that their training has been completed. Any operators who did not submitted their renewal forms have been placed on inactive status. They will be required to submit a reactivation form and \$30.00 reactivation fee before March 1, 2004 to reinstate their license.

Anyone whose license has been inactive for more than two years as of March 1, 2002 has been dropped from our lists and will be required to reapply and pass the exam in order to regain their license.

Dick Darling

Answers to *For Practice*:

1. a. It becomes very difficult to pump sludge, even using positive displacement pumps, when the concentration reached 10%.
2. b 1 mg (milligram) is 1/1000 of a gram. 1 liter of water has, by definition, a mass of 1000 grams. 1000 grams equals 1,000,000 milligrams. Thus, 1 milligram is 1/1,000,000 of a liter so 1 mg/L = 1 part per million
3. b MLVSS stands for Mixed Liquor Volatile Suspended Solids. The MLVSS is a gross measure of the portion of the sludge in the aeration basin that is alive and actually taking up waste from the influent. By maintaining a constant concentration of MLVSS in the aeration basin, the operator ensures that there is a population of live, hungry bugs ready to eat the pollutants in the influent
4. d Pounds = dosage(in mg/L) x Flow (in MGD) x 8.34 lbs/gal x days
Pounds = 4 mg/l x 4.5 MGD x 8.34 lbs/gal x 30 days = 4,503.6 pounds